

Section 22
Planning Assistance To States Program

**Wetlands Restoration & Banking Study:
WETLANDS BANKING OPTIONS
FOR MASSACHUSETTS**

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13. ABSTRACT (Maximum 200 words) The purpose of this study was to assist the Wetlands Restoration and Banking Program (WRBP) in identifying and summarizing the range of options and issues relative to determining the feasibility of wetlands banking in Massachusetts. Results of this effort were used by the Commonwealth of Massachusetts to explore the use of wetlands banks as a means to improve the success rate of wetland mitigation with unavoidable permitted wetlands loss and further implement the policy of no net loss of wetlands. The study was conducted under the authority contained in the Section 22, Planning Assistance to States Program.			
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EXECUTIVE SUMMARY

This report was developed by the New England Division (NED) of the U.S. Army Corps of Engineers at the request of the Commonwealth of Massachusetts, Executive Office of Environmental Affairs' (EOEA) Wetlands Restoration and Banking Program. Authority to conduct this study is contained in the Section 22, Planning Assistance to States Program.

The purpose of this study is to assist the Wetlands Restoration and Banking Program (WRBP) in identifying various options and issues associated with wetlands mitigation banking. The following report is not an exhaustive survey of wetlands banking to date. Several well written reports on the subject, developed by various Federal agencies, were used as sources of information. The information developed as a result of this study will be used by WRBP and EOEA to help determine the feasibility of wetland mitigation banking in Massachusetts.

Wetland mitigation banking is a measure that provides advanced compensation of unavoidable wetland loss through the restoration or creation of wetlands at an off-site location. By definition and according to Federal guidelines, enhancement and preservation are also included. However, in Massachusetts, enhancement is not recognized as a separate banking option and preservation would be included only to provide buffer zones around mitigation sites.

The concept of wetlands banking is still relatively new. Data on existing banks continues to be collected and policy continues to be developed. As of 1992, there were 44 banks in place and over 70 in various stages of planning. Today the numbers are even larger. The majority of existing and planned banks are public works related, that is, they are sponsored and, in most cases used, by public works agencies.

There are several positive aspects of wetlands mitigation banking for Massachusetts. Wetlands banking provides compensation for wetlands loss in advance of the actual loss. Banking involves establishing a large off-site mitigation area that: provides an added means of compensation that may improve mitigation success in general; provides an opportunity to improve the amount of a desired wetland type or function; consolidates resources; receives more careful attention to design and construction; is easier to regulate and monitor; and, can enhance water resource planning and help meet watershed or regional wetland goals.

There are also negative aspects of wetlands mitigation banking for Massachusetts. Some regulatory and environmental groups fear that banking will short-circuit the sequencing process. Some argue that banking is not necessary in Massachusetts, given the current wetlands protection regulations. Mitigation banking is based on the inexact science of wetland restoration or creation and often involves out-of-kind replacements. Concerns remain as to

whether off-site mitigation truly compensates for wetland loss. There is no established method for determining the currency of the bank. Many existing banks use acreage as the bank currency but lose site of some wetland functions in the process. Existing functional assessment methodologies are expensive, favor fish and wildlife values exclusively, or produce data for other functions that are not quantifiable.

Massachusetts currently has strict wetland regulations in place that provide very specific requirements and guidelines for compensatory mitigation. This does not mean that wetlands banking could not be used to improve current mitigation practices.

Many of the mitigation projects that are attempted in Massachusetts do not meet their intended objectives. Often success could be improved through better design and monitoring procedures and mechanisms to implement mid-course corrections. However, in some cases, poor on-site conditions (e.g. lack of proper hydrology, soils, upland buffers ...) may favor the use of an off-site mitigation bank. In order to improve the mitigation success in Massachusetts, wetlands banking could be allowed under the following conditions:

- when on-site compensation is impractical, unavailable, or unlikely to succeed,
- when all impacted functions cannot be replaced on-site,
- or when off-site mitigation is environmentally desirable to achieve some larger ecologic goals.

As discussed at the WRBP Advisory Committee meetings, there is also the possibility of using a mitigation bank site as insurance against individual on-site mitigation projects.

The Massachusetts Wetland Protection Regulations do provide the opportunity to use banking as a mitigation option for limited projects and projects requiring a variance. If Massachusetts decides banking should be an available option for the compensation of bordering vegetated wetlands or land subject to flooding, then the performance standards may need to be modified.

In order to assist the Commonwealth in siting a future pilot bank, a review was conducted of DEP's most recent (1993) Wetlands Tracking System 401 database. The northeast region had the greatest number (54%) of Notices of Intent requiring a 401 permit. This was judged to be the better indicator of wetland fill activity in the database. The Charles River, North Shore, Ipswich River, and Merrimack River watersheds each shared about 16% of the total 401 permit activity for this region. A pilot bank might best be located in one of these watersheds.

There are no "tried and true" methods available to measure bank credits and debits. Many existing banks have used a

combination of acreage, functional value, and best professional judgement in determining bank currency. The challenge for Massachusetts will be to decide upon a method that is both reasonable to implement, but also comprehensive in its assessment of wetland functions. A method such as that used by New England Division (Regulatory Division), the Function-Value Assessment methodology, combined with an acreage approach, may be a way to achieve this goal.

Any proposed wetland mitigation bank in Massachusetts should, at a minimum, be based on the following criteria:

1. Banking should only be implemented in the context of sequencing and only for "unavoidable" impacts.
2. Banking should be used to provide a better environmental result, in terms of acreage and function, than the current regulatory system provides.
3. Banking should be proposed for watersheds with functional deficiencies.
4. Banking should be limited to restoration and creation (in order of preference), with a minimum compensation ratio of 1:1 for acreage and function, unless some regional plan justifies the trade-off of wetland functions. While the consensus at the state level appears to be that preservation is not acceptable for actual mitigation, upland buffers can be used to protect the mitigation banking area.
5. Credits may be withdrawn from banks by project proponents only if they have a valid permit allowing use of banked wetlands for mitigation.
6. Banking should be overseen by a Wetland Banking Committee that should include the Massachusetts DEP and Corps of Engineers, other Federal and state resource agencies (e.g. EPA, NMFS, USF&WS, MDF&W). An MOU/MOA should be the instrument used to establish bank guidelines.
7. Banked wetland credits should be fully functional prior to withdrawal from the bank. Full functionality prior to acceptance into the bank is the optimal approach.

8. A monitoring plan and a dependable source of maintenance funding should be established for each bank site to ensure a greater chance of success. Funding for maintenance of the site can be arranged through various mechanisms such as bonds, escrow accounts, or trust funds.

WETLANDS BANKING OPTIONS FOR MASSACHUSETTS

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WETLANDS BANKING OPTIONS FOR MASSACHUSETTS

STUDY AUTHORITY

This report is part three of a three part effort conducted by the New England Division of the U.S. Army Corps of Engineers at the request of the Commonwealth of Massachusetts, Executive Office of Environmental Affairs' (EOEA) Wetlands Restoration and Banking Program. Parts one and two involve developing a site selection methodology for wetland restoration projects and conducting a case study in the Neponset River watershed using the developed methodology. Authority to conduct this study is contained in the Section 22, Planning Assistance to States Program. The Section 22 program authorizes the Corps to assist the states in preparation of plans for the development, utilization, and conservation of water resources.

PURPOSE AND SCOPE

The purpose of this effort is to assist the Wetlands Restoration and Banking Program (WRBP) in identifying and summarizing the range of options and issues relative to determining the feasibility of wetlands banking in Massachusetts. Though wetlands banking has existed for about 15 years, the Commonwealth has not participated in any banking efforts and therefore has no track record. Results of this effort will be used by the Commonwealth to explore the use of wetlands banks as a means to improve the success rate of wetland mitigation with unavoidable permitted wetlands loss and further implement the policy goal of no net loss of wetlands.

A broad literature search was not conducted as part of this effort as this would only lead to a summarization of banking throughout the rest of the country. This has already been accomplished and can be accessed through several comprehensive documents. Some of the more recent publications including the Corps' Institute for Water Resources (IWR) National Wetland Mitigation Banking Study - First Phase Report and the Environmental Law Institute Wetland Mitigation Banking report were drawn upon to provide general information on banking.

INTRODUCTION TO WETLANDS BANKING IN MASSACHUSETTS

Wetland mitigation banking is a measure that provides advanced compensation of unavoidable wetland loss through the restoration or creation of wetlands at an off-site location. By definition and according to Federal guidelines, enhancement and preservation are also included. However, in Massachusetts, enhancement is not recognized as a separate banking option and preservation would be included only to provide buffer zones around mitigation sites. A buffer zone consists of a bordering

upland area that protects the compensatory wetland from degradation. The wetlands are given estimated tangible and intangible values, called credits. These credits represent a net gain in value over a separate project impacting on wetlands. As anticipated development takes place, credits equivalent to the estimated unavoidable wetland losses are withdrawn or debited from the bank to compensate for the losses incurred. This is what makes wetland mitigation banking so unique as a compensatory measure. It provides the opportunity to mitigate wetland losses by consolidating them and providing for their mitigation, ahead of the actual loss, in a specially managed off-site location.

The concept of banking is still relatively new. However, the use of and improvements to wetlands mitigation banking have increased dramatically in recent years. As of 1992 there were 44 existing and over 70 planned banking systems throughout the country. More recent figures estimate a doubling in the amount of functioning banks. Figures 1 and 2 (developed by IWR) show the location of existing and planned banks as of 1992. Most of the existing banks at that time were concentrated along the Pacific Coast and southeast portions of the country. No banks were established in the southwest or northeast though several were planned. The majority of existing and planned banks are public works related. That is, the banks are initiated and used by state highway or port authorities. About 50% of existing public works banks are devoted to highway work.

POSITIVE ASPECTS OF WETLANDS BANKING FOR MASSACHUSETTS

The advantages of wetlands mitigation banking to the Commonwealth are very similar to those experienced by other states across the country.

Mitigation banking can provide advantages over individual mitigation projects. Compensatory mitigation done in Massachusetts today is done after the wetland loss has already been sustained. There is a certain risk associated with this practice in that the compensation may be done poorly or not at all. There is also a temporary net loss of wetlands functions and values. Banking can eliminate some of this risk and contribute to the "no net loss" wetlands policy by providing the compensation in advance of wetland impacts. In banking, a mitigation site is planned, constructed, and determined to be acceptable before being admitted to the bank. There are possible success rate advantages to providing larger mitigation parcels over small, isolated parcels. Banking may improve on the mitigation success rate by providing a better ecological off-site location. A Corps of Engineers report, Evaluation of Freshwater Wetland Replacement Projects in Massachusetts, published in December 1989, determined that 57 of one hundred mitigation projects examined could be rated as successful or conditionally successful. It states that most failures were due to inadequate

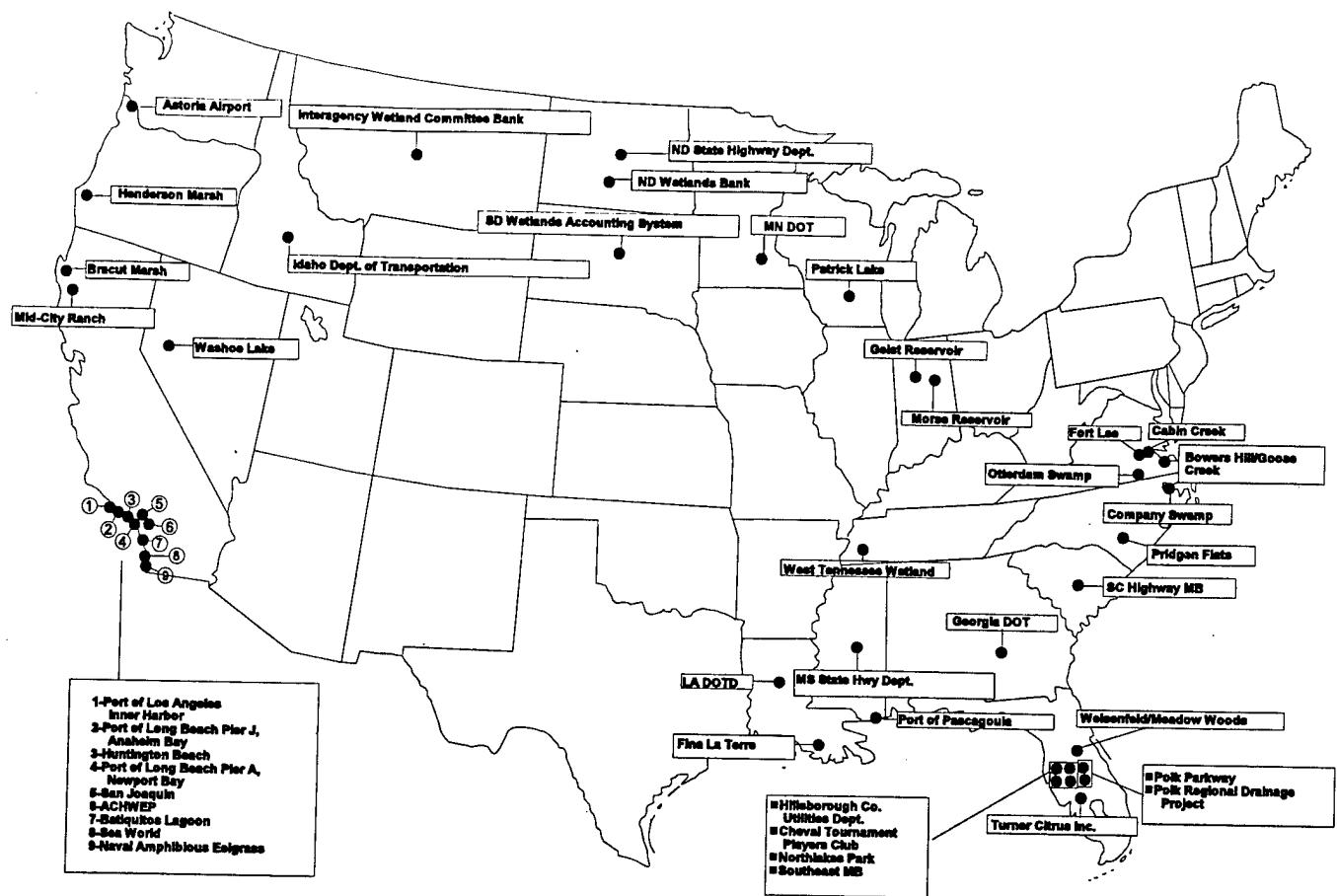


Figure 1.
Existing Wetland Mitigation Banks, Summer 1992



Figure 2.

Wetland Mitigation Banks Under Planning, Summer 1992

site preparation or were of insufficient size to meet 1:1 criteria. Banking can be more economically efficient over individual projects as the costs of designing one large banking project will be similar to smaller designs. By concentrating all the financial, planning, and scientific resources of several mitigation projects into one banking project a more efficient and successful project may be attained. With current mitigation efforts costing anywhere between \$10,000 and \$500,000 per acre, banking may provide a better product for the dollars spent. Banking can eliminate much of the guess work involved in mitigation by establishing success of the mitigation site ahead of the impacts. In addition, banking may provide the opportunity to mitigate for a variety of functional losses. On and off-site mitigation could be combined to more realistically replace what was lost.

Banking is also advantageous in that it may improve current mitigation practices. Regulators may be given the means to protect the environment more efficiently by using several large sites rather than many small ones. Fewer, larger mitigation sites may result in more efficient monitoring efforts. Regulators would also be given a compensatory option that could improve wetland function replacement. Regulators would see a temporary net-gain in wetland functions prior to bank debiting. There may also be more predictability and less conflict during permit actions as regulators would not have to be concerned about whether or not a proposed mitigation plan will succeed because it would have been accomplished up-front. Banking provides regulators with the opportunity to choose a mitigation site that has a better chance of succeeding. On-site mitigation may be insufficient to replace all anticipated functional losses. Banking may provide a site that replaces those functions not compensated for on-site. Banking may also contribute in a positive way to the overall regional or watershed goals for a particular area.

Finally, wetlands banking may contribute positively to the overall mitigation process by requiring a broader based planning effort. There may be watershed, regional, or local community goals for ecological enhancement that individual mitigation projects cannot meet but that banking might provide. A developer or some other sponsor may have the funds needed to meet the wetland improvement goals of state or local conservation groups. Banking may also foster a more cooperative spirit among several communities to meet watershed improvement goals.

NEGATIVE ASPECTS OF WETLANDS BANKING FOR MASSACHUSETTS

The negative aspects of wetlands mitigation banking for Massachusetts are very similar to those expressed by many of the existing banks nationwide.

There are reservations concerning wetlands banking on the part of some regulators involved in mitigation. There is the opinion that banking is not really needed in Massachusetts and that current regulations provide all that is needed to provide adequate compensatory mitigation. Some regulatory and environmental groups fear that banking will "short circuit" the sequencing process (avoid, minimize, and then compensate). This concern is unnecessary as banking would only be applied as part of the compensatory mitigation step after all other options to avoid and minimize were vigorously applied. However, there may be pressure to use an off-site bank without thoroughly exploring all on-site mitigation options. The decision to utilize the banking option may be influenced by the demonstrated success of a particular bank site, versus the uncertainty of proposed on-site mitigation.

Off-site mitigation banking may not provide functional replacements similar to those lost at the impacted area, resulting in a local loss. This raises the concern as to where an off-site bank should be located in relation to the impact site. The question of whether to limit the distance between the impact and bank site to a specified radius or within the same sub-watershed or major watershed, is a difficult one.

Another disadvantage of wetlands banking is that it is based on the inexact science of wetland restoration and creation. There are no "tried and true" methods available to establish bank credits. Methods of measuring credits are discussed later. However, all banks to date have struggled with how to best measure the currency on which a bank will be based. Some have based it on an acreage, while others have used a measure of wetland function, such as habitat units. Functional assessment methodologies can be very costly to apply and do not provide a value that can be adequately quantified.

There is also the difficulty of determining when credits can be accepted and withdrawn from a bank. By definition, credits should be functional before being accepted to the bank. However, there are wetlands where complete functionality cannot be achieved for years. In this case, partial credit is accepted as it develops. Here in eastern Massachusetts about 75% of all wetlands are forested/shrub swamps. These are one of the most difficult and time consuming wetlands to restore or replicate. The longer a proposed bank credit takes to develop, the more risk to the sponsor or credit producer and the more pressure there will be on regulators to deal in credits before they are fully functional.

Mitigation banking can be filled with coordination issues. Cooperation between all parties involved is necessary for wetlands banking to be successful. Also, the possibility of several communities having to cooperate on a banking proposal can

present difficulties. Overlapping boundaries may require multiple community approvals. Not all may want to get involved as they perceive banking as undermining their regulatory control. Also, communities may not wish to participate in a banking project because impacts that occur within their jurisdiction may be compensated for in another community.

REGULATORY CONTEXT OF BANKING IN MASSACHUSETTS

Federal

As Massachusetts examines the feasibility of wetlands mitigation banking, an awareness of the Federal regulations and guidelines is necessary. Massachusetts should, at a minimum, seek to work within this framework. There is a considerable amount of flexibility in the Federal regulations and guidelines.

The primary Federal regulation affecting mitigation banking is Section 404 of the Clean Water Act (CWA). It gives the U.S. Army Corps of Engineers and Environmental Protection Agency (EPA) authority to regulate the discharge of dredged or fill material in waters of the United States. As further spelled out in the 404 (b)(1) guidelines and the 1990 mitigation Memorandum of Agreement (MOA) between the Corps and the EPA, all steps to avoid and minimize wetland impacts must first be demonstrated before compensatory measures are considered. This is called sequencing. Some of the compensatory directives listed in the MOA include:

- On-site, in-kind is preferred, though off-site or out-of-kind mitigation can be undertaken when the prior is found not practicable.
- Restoration is preferred to wetland creation.
- Mitigation banking is an acceptable form of compensatory mitigation.

The "Establishment and Use of Wetland Mitigation Banks in the Clean Water Act" memorandum of 1993 further defines the role of mitigation banking. This memorandum, co-authored by the Corps and the EPA, also states that mitigation banking can be used within the guidelines of sequencing. Banking decisions will be made by carefully considering wetland functions, landscape position, and affected species populations at both the impact and bank sites. The memorandum goes on to state the following:

- Wetland mitigation credits should generally be in place and functional before being used to offset permitted wetland losses. However, it may be appropriate to allow incremental distribution of credits corresponding to the appropriate stage of successful establishment of wetland functions.

- Banking should occur, where appropriate and practicable, within the same watershed as the impact site.
- The use of mitigation ratios (credit vs. impact) may be used to offset the lack of full functionality.
- Establishment of a bank should be accompanied by a formal written agreement (e.g. memorandum of agreement) among the Corps, EPA, other relevant resource agencies, and those parties who will own, develop, operate, or otherwise participate in the bank.
- Functional evaluations of bank credits and debits should be conducted using a consistent methodology. Acreage is an acceptable alternative.

Copies of these two memorandums are provided in Appendix 1.

Finally, a third document, the "New England Interagency Memorandum of Agreement for the Establishment and Operation of Wetland Mitigation Banks" is currently being drafted. This agreement between the Corps' New England Division, Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USF&WS), and National Marine Fisheries Service (NMFS) will provide additional guidance on banking in New England. Specific guidance as to the implementation of mitigation banking will be highlighted. This document will be based on the most recent Federal guidance on the subject which is also currently being drafted.

State

The Massachusetts Wetlands Protection Regulations govern work in and around wetlands in the Commonwealth. The regulations divide wetlands into two categories: coastal and inland. Resource areas included under the jurisdiction of coastal wetlands are the following: land under the ocean, designated port areas, coastal beaches, coastal dunes, barrier beaches, coastal banks, rocky intertidal shores, salt marshes, land under salt ponds, land containing shellfish, and banks of land underlying waterbodies associated with migratory fish. Resource areas included under the jurisdiction of inland wetlands are the following: banks, bordering vegetated wetlands (BVW), land under water, and land subject to flooding.

The regulations are very specific as to which activities can take place and to what extent alterations can occur in and around each resource area. In general, the regulations state that proposed projects shall have no adverse effect on the eight interests of water supply, water quality, flood control, storm damage prevention, erosion, sediment transport, pollution control, and the protection of shellfish, wildlife, or fisheries.

habitat. The regulations do not specifically address wetlands mitigation banking.

There are three specific areas in the coastal wetland regulations that pertain to the use of banking.

For certain limited projects "the issuing authority may issue an Order of Conditions and impose such conditions" that will contribute to the interests identified above. Mitigation, and certainly mitigation banking, can be one of the conditions imposed. Limited projects include public related projects such as: maintenance and improvement of existing roadways and road drainage structures; and maintenance, repair and improvement of buildings, bridges, and culverts, all existing on November 1, 1987.

Mitigation is required as part of the variance procedure. A variance may be issued by the Commissioner of DEP if it is determined that: there are no alternatives that would allow the project to proceed in compliance; a satisfactory mitigation plan is in place; and that the variance is necessary to accommodate an overriding community, regional, state, or public interest. Since the regulations are silent as to what "mitigation" would entail, banking may be a viable option in those instances.

The other provision is that a project intended to restore, rehabilitate, or create a salt marsh, may be permitted; opening the way for banking of this type of wetland.

There are also three specific areas in the inland wetland regulations that pertain to the use of banking.

Again, limited projects can be conditioned to include mitigation banking. Limited projects under the inland wetland regulations includes such projects as: agriculture activities; forestry products; construction and maintenance of underground and overhead utilities; maintenance and improvement of existing public roadways; and the construction and maintenance of new roadways and driveways.

Mitigation is also required as part of the variance procedure and, again, banking may be a viable option in those instances.

The other provisions that pertain to banking are the regulations governing bordering vegetated wetlands and land subject to flooding, two of the more likely resource areas to be impacted or lost.

The loss of up to 5000 square feet of BVW may be permitted as long as it is replaced in accordance with certain performance standards. These standards require that:

- The ground water and surface elevation of the replacement area be approximately equal to that of the lost area.
- The horizontal configuration and location of the replacement area with respect to the stream bank of the waterbody or waterway be similar to that of the lost area.
- The replacement area will have an unrestricted hydraulic connection to the same waterbody or waterway associated with the lost area.
- The replacement area will be located within the same general area of the waterbody or reach of the waterway as the lost area.

Land subject to flooding regulations require that compensation be provided for unavoidable losses. This compensation will be in the form of replaced flood storage volume. This replaced storage will be incrementally equal to the volume of flood water which would be displaced by a proposed project and will have an unrestricted hydraulic connection to the same waterway or water body. With respect to waterways the compensatory storage will be provided within the same reach of the river, stream, or creek.

Regulations for both the BVW and land subject to flooding specify very localized, on-site performance standards for compensatory mitigation. These regulations eliminate off-site banking as a mitigation option for the unavoidable loss of these resource areas.

MANAGEMENT & TYPES OF WETLAND BANKS

Massachusetts wetlands regulators need to understand the basic functions that are involved in wetlands mitigation banking. All banks will share seven basic components (ELI, 1993):

1. Sponsor - The sponsor(s) fosters development of the bank and is responsible for transforming the initial idea for a bank into a reality. In some cases the sponsor has a vested interest in the bank, participating in both credit production and use.
2. Client - The bank client is the user of banked credits. The bank client withdraws credits with which to compensate for the client's wetland losses. The client may or may not have a direct role in the establishment or management of the bank.
3. Regulatory Role - Those agencies and other interested

groups that will oversee the establishment and use of the bank. Construction of a bank site may be regulated by the Corps of Engineers under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA. Other Federal agencies involved would include the USF&WS, NMFS, and the EPA. State regulatory agencies would include: the Massachusetts Department of Environmental Protection (MDEP), Massachusetts Coastal Zone Management Office, Department of Fish and Wildlife, and local conservation commissions.

4. Credit Production - A credit producer locates, gains entry, and is responsible for construction and maintenance of the bank site. Credits are established through either restoring degraded wetland sites or through creating new wetlands in non-wetland areas.

5. Credit and Debit Evaluation - Wetland credits and debits are the currency used in banking transactions. Credits and debits are standard units of measurement that quantify the net gain and loss of acreage or functions. Credit and debit evaluation should be done by one of the regulatory agencies (e.g. Corps of Engineers and MDEP).

6. Bank Management - The bank manager maintains accounts of credit and debit actions. In a single-client bank management often resides with one of the regulatory agencies.

7. Long-Term Land Ownership - Banked wetlands are planned and managed to exist in perpetuity. This is usually accomplished by bank sponsors owning the land in fee or long-term lease agreements between bank sponsors and landowners. Since many of the existing banks are public works sponsored, they exist on public lands and are protected from future development. Long-term protection of the banked wetlands should be covered by the bank agreement.

Types of Banks

There are several types of banks: single-client, joint project, public commercial, or private commercial. In a single-client bank, the sponsor initiates the bank, produces the credits, and is also the client. This type of bank is the most popular and is characteristic of the many public works (transportation department and port authority) banks. A joint project bank is one where two or more entities, a combination of public and private possibly, combine efforts. A public commercial or general use bank is sponsored by a public agency, established for construction activities in a particular area, and credits are made available to private developers. Private commercial or entrepreneurial banks are sponsored by private

developers with the purpose of selling compensatory credits on the open market.

Of the options available to Massachusetts, the single-client bank should be considered first. Arranged with groups such as the Highway Department, Massachusetts Water Resources Authority, or Port Authority, a public agency sponsored bank could provide a reasonably dependable sponsor and the simplicity of a one sponsor/one-client arrangement. The passage of the Intermodal Surface Transportation Efficiency Act of 1991 gives the Federal Highway Administration authority to cost share the establishment of off-site wetland mitigation banks.

A private commercial bank may also be a viable option. Properly established, this kind of bank may provide a broad based interest and participation in the bank.

Bank Structure

In Massachusetts as well as other states careful planning of the bank is critical. All Federal, State, and local regulating authorities need to be brought together early in the process. The roles of each party must be defined as early as possible. The Commonwealth should consider establishing a Wetland Banking Committee as part of this effort. It would include representatives from all the major regulatory groups (Corps, EPA, USF&WS, NMFS, MDEP, MF&W, . . .) and would oversee any banking done within the State. Provisions should be made to involve local/regional conservation groups depending on the location of the proposed bank. Also, successful banking will include a plan of design, construction, and monitoring of the proposed bank site which is clearly defined up front with the sponsor.

It should be mentioned here that since both Federal and state regulators will be involved in the development and management of any proposed mitigation bank in Massachusetts, problems may arise as a result of different requirements for mitigation. For instance, there may be situations where the state requires mitigation but the Corps would not (e.g. < 5,000 square feet wetlands fill under Programmatic General Permit). Or situations may arise where both the state and Corps require mitigation, but in differing amounts due to distinctive criteria and measurement. To avoid confusion and possible double counting of credits, prior to any banking activity taking place these issues will need to be resolved by the managing committee and included as part of the contractual arrangement.

Wetlands banks in Massachusetts should be established using contracts called enabling instruments. The instrument should include: the bank location, goals, sponsors, participants, maintenance plan, method used to establish and measure credits and debits, accounting procedures, geographic area of

applicability, monitoring requirements, remedial action, funding description, and measures to protect the bank in perpetuity. There are several types of bank enabling instruments. The memorandum of agreement or understanding (MOA, MOU) is the most popular and successful method used. This contract between the bank committee and the credit producer spells out in detail the conditions under which banking will take place. This method has proven to be very successful with single-client banks and is flexible enough, with the use of addendums, to take on additional sponsors.

Other methods include individual project permits, individual bank permits, general permits, and specific legislation. An individual project permit would allow the banking of surplus mitigation credits. This method poses problems as it is site specific and does not address all the issues associated with banking. Individual bank permits allow a specific development entity to accumulate credits and debits against a bank. The permit is amended as transactions take place. This provides added flexibility over individual project permits. A general permit is similar to a bank permit except in this case a permitting authority issues a permit to a resource group or agency to operate a bank. This approach was used in Juneau, Alaska. Regulators have not been satisfied with this method since they are somewhat removed from the everyday operation of the bank. Specific legislation has been attempted once but failed due to it being too general in its approach to a fairly site specific need.

Monitoring

Once a bank proposal is accepted and initiated it enters a period of monitoring to ensure the site develops as intended. Monitoring should be conducted by properly trained individuals (e.g. engineers, hydrologists, biologists). Most existing banks that address this issue, place responsibility for monitoring with the credit producer. The regulating agencies usually reserve the right to inspect the site at any time. Another option is to have the monitoring done by the regulatory authorities, but funded by the credit producer or client. An arrangement with a local university may provide a cost efficient monitoring agent. Whatever approach is taken, the Commonwealth should avoid the situation where regulators are left handling all monitoring at their own expense. A properly certified report should be supplied by the monitoring group to the bank committee for its inspection. The frequency of monitoring will probably vary with the situation. The Chicago Homebuilders Bank was designed to be monitored each month for several years after construction and then annually for the next 15 years at which time the monitoring would end. The Prince George County Bank in Maryland is monitored annually or after every major storm event, whichever comes first, for 5 years after construction.

Credit Management

The time at which credits will be accepted into a bank and be available for debiting is a critical, but very subjective issue in banking. Having the bank site completely achieve some predetermined level of functional success before accepting its credits into the bank would be the optimal approach. Much of the risk of mitigation failure is eliminated this way. Although achievement of this goal may be desirable, it is probably impractical. It should be noted that just because a bank does not meet its initial goals does not mean it is a total failure. The bank may be ecologically valuable but for reasons other than what was originally intended. The enabling instrument should acknowledge this and allow provisions for use of any value achieved.

As mentioned, the ideal crediting situation does not always exist. Developers approach regulators with bank proposals where the project may take several years to reach some agreed upon level of success. If bank sponsors are not given some assurance that they will receive some credit return on their investment in a reasonable period of time, than they may be discouraged from attempting the project. Several existing banks have avoided this by accepting partial credit as the site is monitored. As more credits develop, they are accepted and made available for withdrawal. Debits can only be made against those accepted credits. Other banks have used ratios to "make up" for project uncertainty. In some cases credits based on a partially functioning site are debited at a higher ratio compared to the impact site (e.g. 5:1 ratio of banked credits versus impacts). This will be discussed in more detail further on.

Long-term Ownership

After a period of monitoring has elapsed the bank site enters the last phase, long-term ownership. By this time, the credit producer has invested a substantial amount of funds and effort in the site. In order to secure the land in perpetuity, the bank site should be deeded to a public resource agency or non-profit group, or stay in possession of the original owner, but with conservation restrictions built into the deed. There must be restrictions written into the deed that assure the land is preserved in its intended state.

Funding

Banking requires funding for initial site preparation. The sponsor usually provides the initial resources for credit development. If the credit producer is also the client, these expenses are viewed as advanced mitigation payments. Otherwise, fees are collected by the credit producer in order to recoup costs or, in the case of an entrepreneurial bank, also earn a

profit.

Based on recent studies, long-term financial or insurance arrangements are not common in existing banks. Recently planned banks are addressing this issue more and more. While the sponsor and or credit producer are responsible for maintaining the site for a designated period of time (not necessarily limited to the monitoring period), sometimes physical problems with the bank site arise, but remedial actions are neglected. Massachusetts should insure that a funding source is available in case of these situations. Some different ways of insuring the bank are through bonds, trust funds, or escrow accounts.

A surety bond is purchased by either the sponsor or credit producer to ensure that the site functions properly for a specified period of time. Once that time has elapsed the bond can be released. The surety bond can also be staged so that as certain milestones are met, portions of the bond can be released. This method provides both insurance funds and an incentive to the sponsor or credit producer to maintain the job properly.

A trust fund entails placing funds in an interest bearing account. The interest generated is used to fund any maintenance of the bank site for a specified period of time.

An escrow account would involve depositing a predetermined amount of money in an interest bearing account each time a credit is withdrawn or sold. The base amount and interest would be "tied up" for a specified period of time. This method also provides incentive as funds are recouped as long as the work is properly maintained.

SUGGESTED SIZE AND GEOGRAPHIC SCOPE OF WETLAND BANKS

Size

The size of wetlands banks varies greatly throughout the country. As of the 1992 inventory, there were 44 existing banks ranging in size from 1 to 7,000 acres in size. The median size was 33 acres. California Department of Fish and Game guidelines recommend that banks not exceed 50 acres in size. Minnesota has taken the position that banks should be 10 to 100 acres in size. In general, banks should be sized according to their compensatory objectives. However, there are those who argue banks should be as large as possible to avoid fragmentation and other causes of failure found in small, isolated mitigation projects (Kusler and Kentula, 1990).

Many of the country's existing banks do not allow debits greater than 5 acres. Statistically, debiting ranges between 1 and 63 acres. The average is 3.6 acres. The intent behind small debits is to ensure the bank is available for a longer period of

time so that it serves more ecologically needy projects and discourages large mitigation projects.

In Massachusetts, the regulations allow the loss of up to 5,000 square feet of BVW, provided the area is replaced. These and similar small scale fills (e.g. limited projects) may best lend themselves to mitigation banking. This would take advantage of the benefits associated with larger mitigation projects such as economies of scale and improved potential for monitoring. It would also alleviate some of the problems associated with small, isolated mitigation projects. Single, large mitigation projects may already have some of these benefits and have the potential to debit an entire bank's credits. Therefore, there probably exists an upper limit on the size of projects that can debit from the bank. Based on this information Massachusetts can exercise its discretion in sizing potential banks and the appropriate scale for withdrawals.

Geographic Scope

The distance between impact and bank site varies also. For DOT banks the distance has been as great as 250 miles. This is due to the fact that initially there were few DOT banks and the distance from the impact site was allowed to be large. As more bank sites have been established this distance has become much smaller. It is more in line with non-DOT banks which range up to 50 miles. About 50% of the existing bank agreements specify that wetland compensation will occur within the same hydrologic area (determined on a case by case basis) as the bank. Some banks allow debiting across hydrologic boundaries. There has been no interstate banking attempted.

Massachusetts will need to carefully consider the range over which the bank will be allowed to compensate for wetland impacts. The location of the bank relative to the impact site depends on the function that is impacted. Obviously it would be preferable to locate the bank as near as possible to the impact site (e.g. neighborhood, subwatershed, or town). However, for bank location this is impractical. The distance from the impact site is dependent on the scale of the function being impacted. For instance, if the impact to waterfowl in a particular wetland is the main concern, the flyway is the scale. If the concern is a game animal such as deer, then the wildlife management region may be the appropriate scale. It is desirable for banks to be located in the same biotic region as the loss being compensated for. This helps insure that physical continuity, ecological integrity, and habitat use patterns of wetlands are maintained. For water quality, the watershed scale is probably the most appropriate. For flood storage, mitigation may be required within the same hydraulic reach. In some cases, certain functional components will be mitigated on-site while others may be compensated for at an off-site bank. Current Corps and EPA

guidelines state that mitigation banking should occur, where practicable, in the same watershed as the impact.

If a watershed approach is taken, Massachusetts must then decide what constitutes a "watershed". A watershed could be as large as the Connecticut River watershed or as small as the drainage area of a stream. According to the U.S. Department of Agriculture, Soil Conservation Service's (SCS) Hydrologic Unit Map of Massachusetts, the state is composed of several major and many sub-watersheds. For example, the Merrimack River subregion is composed of the Lower Merrimack River Valley, Nashua River, Sudbury River, and Assabet River watersheds. Within each of these watersheds are several sub-watersheds. Massachusetts may want to limit banking activities, in general, to distances that do not exceed the watershed boundary level. Wetland impacts that occur in a given watershed would be compensated for with banked credits in that same watershed. Using the watershed level boundary as defined by SCS could provide the state with a geographic area large enough to sustain use of the bank site and also provide ecologically similar areas with which to conduct mitigation.

Location

Massachusetts should focus efforts to initiate a bank in those areas that most need it. A review of the most recent (1993) Wetlands Tracking System 401 database was conducted to determine where possible development pressures exist in Massachusetts. According to the database, the southeast region of the state had the greatest number (42%) of Notices of Intent (NOI) filed. However, it was the northeast region that had the greatest number (54%) of NOI requiring a 401 permit, the better indicator of wetland fill activity in the database. The Charles River, North Shore, Ipswich River, and Merrimack River watersheds each shared about 16% of the total 401 permit activity for this region. Boston, Gloucester, Boxford, and Haverhill were the leading communities for each of these watersheds, respectively. A pilot bank might best be located in one of these watersheds.

The central region averaged about 19%, and the southeast and west regions about 13% of the total 401 permit activity in 1993. In the central region the Blackstone River watershed had the largest number, about 25%. In the southeast region the Cape Cod watershed had the largest number with about 36%. In the west region the Housatonic River watershed had the largest number with about 28%.

Massachusetts can use a number of different approaches in screening potential bank proposals. One method is the historic approach to bank planning. This involves establishing a bank that restores a wetland to a previously determined condition. This approach requires a fair amount of research and site

analysis to determine desired soil conditions, vegetation, and hydrology. A second approach would be to establish a bank that maximizes an array of wetland functions. In this case the entire ecosystem is considered, and an attempt is made to replicate or restore as many wetland functions as possible. This approach has disadvantages in that there is a greater chance the project may not meet its intended goals. A third approach would be to maximize one or more specific functions such as providing habitat for one species, or improving water quality or flood storage capacity. This may be the easiest approach to take, possibly even the least costly. However, with this approach functional diversity is sacrificed (ELI, 1993).

One issue common to all three of these approaches is economics. Massachusetts should strive to balance ecology and costs in its banking efforts. Wetland bank proposals that are costly and do not have a high success potential will not meet the needs of any involved in mitigation banking.

In order to screen potential restoration banking sites at the watershed level, a selection methodology will be used that is currently being developed between the MWRBP and the Corps' New England Division. This methodology is primarily targeted at identifying sites for non-mitigative restoration projects. The process involves: identifying watershed functional deficits; inventory of potential restoration sites; screening of the sites with regard to the ability to supply needed functions, logistical considerations, environmental stressors, etc.; and a detailed evaluation of the selected site.

There are several resources available to aid in bank planning. Watershed associations or other resource groups can often provide information on wetlands. Many of these groups have invested large amounts of time and resources in collecting wetland information. The Corps' Regulatory and State DEP data bases can be queried to determine the number of projects impacting wetlands. Local conservation commissions can also be contacted to determine more detailed information. Other sources of information are: the National Wetlands Inventory Maps, State Wetlands Maps, GIS mapping, existing aerial photography, and the Soil Conservation Service's Soil Survey Reports. Special Area Management Plans (SAMPs), under the state's Coastal Zone Management program, can provide data concerning the relative value of wetlands in an area and aid in determining the best siting of potential banks. Use of the Section 404 (b)(1) Advanced Identification (ADID) process, through the Corps and EPA, determines wetlands suitability for disposal activities prior to application filing. This may also assist the Commonwealth in determining the value of certain wetlands. Other planning tools include county and municipal planning offices and EPA statewide planning grants.

TYPES OF WETLANDS SUITABLE FOR BANKING IN MASSACHUSETTS

While freshwater and salt marsh restoration have the most likelihood of successful production of credits, they are not necessarily the best choice for mitigation banking. Nationally, these are the types of projects that have seen the most success. The reason for this is that the proper soils (organics) and hydrology are often readily available.

Except bogs and fens, which may be next to impossible to recreate, the advantages of banking (e.g. potential for mid-course corrections and the greater likelihood of utilizing a highly qualified mitigation team) mean the emphasis may better be placed on wetlands that are more difficult to restore or create and take longer to develop. Those sites that can be restored using proactive restoration opportunities should be done in that manner. Although, in general, restoration or creation of forested/shrub swamps has been less successful, they comprise the greater portion of wetlands in Massachusetts and subsequently a greater proportion of the wetlands impacted. Therefore, there exists a need to bank these wetland types as well. These wetlands are difficult to restore or create because of the greater time and effort needed to determine if the site will succeed. The additional time for these wetlands to develop and the lower certainty of success can be accounted for in crediting.

In summary, Massachusetts should not limit all banking activities to either the most or the least difficult mitigation projects. Many wetland types may be suitable for banking. In order to best serve its planning efforts, the state should leave all options open.

More than the type of wetland to be banked, the state needs to face the issue of risk. In an ideal world, a developer will propose a restoration project, it will be approved, and within a year or two after construction, the site will have undergone sufficient development to be accepted into the bank. This way there is minimal risk to the state as the credits are developed prior to bank acceptance. The developer's risk lies mostly in the period of time between plan acceptance and credit acceptance. If the site is a shrub swamp, it may require ten years to develop completely. The developer will not want to wait that long to get the credits accepted into the bank. If the state places a high value on this type of wetland and wants the project, it may have to accept partial functionality. Accepting bank credits that are not fully developed will increase the state's risk.

CREDIT AND DEBIT SYSTEM ISSUES

Methods of Measurement

One of the most difficult issues to be faced by Massachusetts will be the definition of the currency upon which a bank will operate. A bank deals in credits and debits that are based on some quantitative or qualitative measure.

The quantitative or inventory approach typically gives acreage as an output. This method is usually the easier, less expensive approach. However, it is also the least sensitive to a wetland's complete array of functions. About 50% of existing banks use acreage as the bank currency.

The qualitative approach or function evaluation methods are used to analyze the ability of the wetland to produce certain functions. Two of the methods available are the Wetland Evaluation Technique (WET) and the Habitat Evaluation Procedures (HEP). WET provides an indication of probability level that a wetland is able to provide a particular function. No existing banks use WET for crediting and debiting purposes. The New England Division does not accept WET as an appropriate wetland assessment methodology. Though the ecological principles are sound, the concept of probability and tabulation of ranking functions is not accepted. HEP quantifies fish and wildlife habitat values only. It has no means to measure other functions. This method produces habitat units that have been used for banking purposes. About 50% of existing banks use some form of functional assessment methodology, such as HEP, to measure credits and debits. Some banks use a combination of acreage, functional assessment, and "best professional judgement" in establishing credit value. Efforts are currently underway to develop better methods of measuring wetland functions and values that may be used as part of a function-acre bank currency system. The use of pure economic analysis has been avoided in banking due to the difficulty in placing a dollar value on most wetland functions.

The New England Division (Regulatory Division) uses a Function-Value Assessment Methodology which is similar to WET. This method is based on the same scientific information about structure and function of wetlands as the methods previously mentioned. This method is structured so that a maximum amount of descriptive information, on a particular site, is provided to the reviewer on a single page. Rather than rate wetlands or assign weights to functions, this methodology is intended to provide as much hydrologic, biologic, and cultural information about each wetland as possible. Using a standardized evaluation form (see Appendix 2), the impacted wetland is evaluated for thirteen possible functions and values. Each of these criteria is evaluated using a series of considerations designed to help the

reviewer make a proper judgement regarding each function or value. Massachusetts has a similar list that includes eight wetland values. This difference in accepted functional values between the state and Federal government may need to be resolved for banking to take place. This method, like all the rest, presents difficulties for banking in that it does not provide a quantitative basis with which to define credits. However, it can and is combined with acreage to form a function-acre currency system (e.g. 3 acres of a 6 acre site provides a particular wildlife habitat).

More rigorous evaluative methods are available to assess wetland functions. For instance, flood storage can be measured accurately at both the impact and bank sites although it is somewhat time consuming and expensive. The same is true of assessment methodologies used to measure other wetland functions in detail.

Ratios

Some banks have used higher ratios to: create an incentive to restore or create a more desired type of wetland, separate the value of different types of banking (e.g. restoration at 2:1, preservation at 10:1), and compensate for credits that are accepted to the bank but not fully mature. Several existing banks have instituted procedures where immature credits can be withdrawn, but at a higher ratio. The Weisenfeld Bank in Florida has withdrawal ratios as high as 20:1 to cover the risk that the credits might not mature as intended. As the credits mature over time, the withdrawal ratio is lowered. As of 1992, the withdrawal ratios for existing banks ranged on average between 1:1 and 2:1.

The goal of the state should be to develop a mitigation banking system that works, that is, that reasonably minimizes uncertainty. Existing regulations for BVW's require 1:1 replacement. It would be inappropriate to require higher replacement ratios for banking based on uncertainty since the likelihood of success is higher with banking than without. Massachusetts may want to institute procedures that allow immature credits to be withdrawn at a higher ratio in order to achieve 1:1 functional replacement. Due to the lag in development of some wetland functions, it is difficult to achieve 1:1 replacement in the short term. Estimates of the functional development time-lag can be used to determine the appropriate replacement ratio. On the other hand, as mentioned previously, much of the uncertainty can be avoided by not accepting credits into the bank that have not reached a specified level of maturity.

DESCRIPTION OF POTENTIAL MASSACHUSETTS PILOT BANK

Massachusetts currently has strict wetland regulations in place that provide very specific requirements and guidelines for compensatory mitigation. Massachusetts does not need to use wetlands banking to institute compensatory mitigation. This does not mean that wetlands banking could not be used to improve current mitigation practices.

A large percentage of attempted mitigation projects in Massachusetts do not meet their intended goals (Corps, 1989). For many projects, success could be improved through better design and monitoring procedures and mechanisms to implement mid-course corrections. In some cases though, poor on-site conditions (e.g. lack of proper hydrology, soils, upland buffers ...) might favor the use of an off-site location. Therefore, the state may want to use mitigation banking under the following conditions:

- when on-site compensation is impractical, unavailable, or unlikely to succeed,
- when all impacted functions cannot be replaced on-site,
- or when off-site mitigation is environmentally desirable to achieve some larger ecologic goals.

As discussed at the WRBP Advisory Committee meetings, there is also the possibility of using a mitigation bank site as insurance against individual on-site mitigation projects. Banked credits would be withdrawn, with a user fee being paid, until such time an individual mitigation project succeeds. Once that occurs the credits are returned to the bank. If the mitigation project fails, the wetland loss is covered by the banked credits.

The Massachusetts Wetland Protection Regulations do not address the use of mitigation banking directly. However, it does provide the opportunity to use banking as a mitigation option for limited projects and projects requiring a variance. If Massachusetts decides banking should be an available option for the compensation of bordering vegetated wetlands or land subject to flooding, then the performance standards may need to be modified.

A proposed mitigation bank should be located in an area (watershed or subwatershed) where it could best be used. A pilot bank might best be conducted in cooperation with one of the state's public works agencies. In order to aid the Commonwealth in siting a potential bank site, a review of the most recent (1993) Wetlands Tracking System 401 database was conducted. The northeast region had the greatest number (54%) of NOI requiring a 401 permit, the better indicator of wetland fill activity in the

database. The Charles River, North Shore, Ipswich River, and Merrimack River watersheds each shared about 16% of the total 401 permit activity in this region. A pilot bank might best be located in one of these watersheds.

There are no "tried and true" methods available to measure bank credits and debits. As mentioned previously, many existing banks have used a combination of acreage, functional value, and best professional judgement in determining bank currency. The challenge for Massachusetts will be to decide upon a method which has reasonable implementation costs, but is also comprehensive in its assessment of wetland functions. A method such as that used by the Corps' New England Division (Regulatory Division), the Function-Value Assessment methodology, combined with an acreage approach, may be a way to achieve this goal.

Finally, any proposed bank should be based on the following criteria:

1. Banking should only be implemented in the context of sequencing and only for "unavoidable" impacts.
2. Banking should be used to provide a better environmental result, in terms of acreage and function, than the current regulatory system provides.
3. Banking should be proposed for watersheds with functional deficiencies.
4. Banking should be limited to restoration and creation, (in order of preference), with a minimum compensation ratio of 1:1 for acreage and function, unless some regional plan justifies the trade-off of wetland functions. While the consensus at the state level appears to be that preservation is not acceptable for actual mitigation, upland buffers can be used to protect the mitigation banking area.
5. Credits may be withdrawn from banks by project proponents only if they have a valid permit allowing use of banked wetlands for mitigation.
6. Banking should be overseen by a Wetland Banking Committee that should include the Massachusetts DEP and Corps of Engineers, other Federal and state resource agencies (e.g. EPA, NMFS, USF&WS, MDF&W). An MOU/MOA should be the instrument used to establish bank guidelines.
7. Banked wetland credits should be fully functional prior to withdrawal from the bank. Full functionality

prior to acceptance into the bank is the optimal approach.

8. A monitoring plan and a dependable source of maintenance funding should be established for each bank site to ensure a greater chance of success. Funding for maintenance of the site can be arranged through various mechanisms such as bonds, escrow accounts, or trust funds.

BIBLIOGRAPHY

Environmental Law Institute, 1993. Wetland Mitigation Banking. Washington, D.C., 159 pp.

Kusler, J. and M.E. Kentula, 1990. Wetland Creation and Restoration: The Status of the Science. Washington, D.C., Island Press, 594 pp.

"Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404 (b)(1) Guidelines". February 1990. Washington, D.C.

U.S. Army Corps of Engineers, Institute for Water Resources, 1994. National Wetland Mitigation Banking Study - Expanding Opportunities for Successful Wetland Mitigation: The Private Credit Market Alternative. IWR Report 94-WMB-3, prepared by Leonard Shabman, Virginia Tech University, Blacksburg, Virginia, and Paul Scodari and Dennis King, King Associates, Washington, D.C.

U.S. Army Corps of Engineers, Institute for Water Resources, 1994. National Wetland Mitigation Banking Study - First Phase Report. IWR Report 94-WMB-4, prepared by Robert Brumbaugh and Richard Reppert, Institute for Water Resources, Alexandria, Virginia.

U.S. Army Corps of Engineers, Institute for Water Resources, 1992. National Wetland Mitigation Banking Study - Wetland Mitigation Banking Concepts. IWR Report 92-WMB-1, prepared by Richard Reppert, Institute for Water Resources, Alexandria, Virginia.

U.S. Army Corps of Engineers, New England Division, 1989. Evaluation of Freshwater Wetland Replacement Projects in Massachusetts.

U.S. Environmental Protection Agency and U.S. Department of the Army, "Memorandum to the Field: Establishment and Use of Wetland Mitigation Banks in the Clean Water Act Section 404 Regulatory Program". August 1993. Washington, D.C.

APPENDIX 1

FEDERAL GUIDELINES TO
WETLANDS MITIGATION BANKING



DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

7 FEB 1990

CECW-OR

MEMORANDUM FOR SEE DISTRIBUTION

Subject: Section 404 Mitigation Memorandum of Agreement

1. On 15 November 1989, the Department of the Army and the Environmental Protection Agency (EPA) signed a memorandum of agreement (MOA) that clarifies the procedures to be used in determining the type and level of mitigation necessary to demonstrate compliance with the Clean Water Act Section 404(b)(1) Guidelines. The MOA becomes effective on 7 February 1990. A copy of the MOA is enclosed. This represents the official version and reflects the changes made to the 15 November 1989, MOA previously provided to you.

2. The MOA represents several years of hard work by both EPA and the Army Corps of Engineers. It, along with other recent accomplishments such as the new Federal wetlands delineation manual, are good examples of the renewed spirit of cooperation between EPA and the Corps at the Headquarters level. I am encouraged by these initiatives and committed to ensuring that the Corps Regulatory Program is undertaken in a manner fully consistent with the goals of the Clean Water Act and the Section 404(b)(1) Guidelines. I expect no less from each FOA Commander, Office of Counsel, and Regulatory staff.

3. The MOA is consistent with the President's goal of no overall net loss of wetlands and affirms the Corps existing policy of striving to avoid adverse impacts and offset unavoidable adverse impacts to aquatic resources. I fully support these initiatives and will work to ensure that they are integrated into all Corps activities. This includes site selection, plan development, maintenance, and operation of Corps projects, as well as the Regulatory Program. It is important to emphasize, however, that while the MOA's implementation can contribute to a goal of no overall net loss of the nation's remaining wetland base, the MOA does not establish a no net loss policy. In fact, the MOA expressly recognizes that achieving no net loss of wetlands values and functions is not possible for every permit action. The President's Domestic Policy Council Interagency Working Group on Wetlands is currently developing policy on no overall net loss of wetlands.

4. The MOA interprets and provides internal guidance and procedures to the Corps and EPA field personnel for implementing existing Section 404 permit regulations. The MOA does not change substantive regulatory requirements but instead provides a

CECW-OR

SUBJECT: Section 404 Mitigation Memorandum of Agreement

procedural framework for considering mitigation so that all Corps and EPA field offices will follow consistent procedures in determining the type and level of mitigation necessary to ensure compliance with the Section 404(b)(1) Guidelines. The MOA clarifies requirements contained in the Section 404(b)(1) Guidelines in response to questions that have arisen on these requirements. Moreover, the MOA does not establish any new mitigation requirements beyond those currently found in the Guidelines or modify the existing Guidelines requirements. The MOA also maintains the flexibility of the Guidelines by expressly recognizing that no net loss of wetlands functions and values may not be achieved in each and every permit action.

5. As a result of recent conversations between Headquarters and FOA regulatory staffs, several questions have consistently been raised. In response, the Regulatory Branch staff has prepared the enclosed "Q's and A's" which address many of the issues raised. These Q's and A's have been reviewed and agreed to by EPA. EPA will send the Q's and A's, as well as a similar memo to all EPA Region Offices.

6. The Mitigation MOA represents a most significant and positive step in emphasizing our commitment to accomplishing our mission of restoring and maintaining our valuable aquatic resources. Further, I am confident that the MOA will facilitate continued improvement in our daily relations with EPA, as well as other resource agencies.

7. Additional questions or comments may be directed to Dr. John Hall, Acting Chief, Regulatory Branch, at (202) 272-1785 or Mr. Michael Davis, the Regulatory Branch POC, at (202) 272-0201.

Encls



H. J. HATCH
Lieutenant General, USA
Commanding

DISTRIBUTION:
(see Page 3)



**MEMORANDUM OF AGREEMENT
BETWEEN THE ENVIRONMENTAL PROTECTION AGENCY
AND THE DEPARTMENT OF THE ARMY CONCERNING
THE DETERMINATION OF MITIGATION UNDER THE
CLEAN WATER ACT SECTION 404(b)(1) GUIDELINES**



1. Purpose

The United States Environmental Protection Agency (EPA) and the United States Department of the Army (Army) hereby articulate the policy and procedures to be used in the determination of the type and level of mitigation necessary to demonstrate compliance with the Clean Water Act (CWA) Section 404(b)(1) Guidelines ("Guidelines"). This Memorandum of Agreement (MOA) expresses the explicit intent of the Army and EPA to implement the objective of the CWA to restore and maintain the chemical, physical, and biological integrity of the Nation's waters, including wetlands. This MOA is specifically limited to the Section 404 Regulatory Program and is written to provide guidance for agency field personnel on the type and level of mitigation which demonstrates compliance with requirements in the Guidelines. The policies and procedures discussed herein are consistent with current Section 404 regulatory practices and are provided in response to questions that have been raised about how the Guidelines are implemented. The MOA does not change the substantive requirements of the Guidelines. It is intended to provide guidance regarding the exercise of discretion under the Guidelines.

Although the Guidelines are clearly applicable to all discharges of dredged or fill material, including general permits and Corps of Engineers (Corps) civil works projects, this MOA focuses on standard permits (33 CFR 325.5(b)(1))¹. This focus is intended solely to reflect the unique procedural aspects associated with the review of standard permits, and does not obviate the need for other regulated activities to comply fully with the Guidelines. EPA and Army will seek to develop supplemental guidance for other regulated activities consistent with the policies and principles established in this document.

This MOA provides guidance to Corps and EPA personnel for implementing the Guidelines and must be adhered to when considering mitigation requirements for standard permit applications. The Corps will use this MOA when making its determination of compliance with the Guidelines with respect to mitigation for standard permit applications. EPA will use this MOA in developing its positions on compliance with the Guidelines for

¹Standard permits are those individual permits which have been processed through application of the Corps public interest review procedures (33 CFR 325) and EPA's Section 404(b)(1) Guidelines, including public notice and receipt of comments. Standard permits do not include letters of permission, regional permits, nationwide permits, or programmatic permits.

proposed discharges and will reflect this MOA when commenting on standard permit applications.

II. Policy

A. The Council on Environmental Quality (CEQ) has defined mitigation in its regulations at 40 CFR 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. The Guidelines establish environmental criteria which must be met for activities to be permitted under Section 404.² The types of mitigation enumerated by CEQ are compatible with the requirements of the Guidelines; however, as a practical matter, they can be combined to form three general types: avoidance, minimization and compensatory mitigation. The remainder of this MOA will speak in terms of these more general types of mitigation.

B. The Clean Water Act and the Guidelines set forth a goal of restoring and maintaining existing aquatic resources. The Corps will strive to avoid adverse impacts and offset unavoidable adverse impacts to existing aquatic resources, and for wetlands, will strive to achieve a goal of no overall net loss of values and functions. In focusing the goal of no overall net loss to wetlands only, EPA and Army have explicitly recognized the special significance of the nation's wetlands resources. This special recognition of wetlands resources does not in any manner diminish the value of other waters of the United States, which are often of high value. All waters of the United States, such as streams, rivers, lakes, etc., will be accorded the full measure of protection under the Guidelines, including the requirements for appropriate and practicable mitigation. The determination of what level of mitigation constitutes "appropriate" mitigation is based solely on the values and functions of the aquatic resource that will be impacted. "Practicable" is defined at Section 230.3(q) of the Guidelines.³ However, the level of mitigation determined to be appropriate and practicable under Section 230.10(d) may lead to individual permit decisions which do not fully meet this goal because the mitigation measures necessary to meet this goal are not feasible, not practicable, or would accomplish only inconsequential reductions in impacts. Consequently, it is recognized that no net loss of wetlands functions and values may not be achieved in each and every permit action. However, it remains a goal of the Section 404 regulatory program to contribute to the national goal of no overall net loss of the nation's remaining wetlands base. EPA and Army are committed to working with others through the Administration's interagency task force and other avenues to help achieve this national goal.

²(except where Section 404(b)(2) applies).

³Section 230.3(q) of the Guidelines reads as follows: "The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." (Emphasis supplied)

C. In evaluating standard Section 404 permit applications, as a practical matter, information on all facets of a project, including potential mitigation, is typically gathered and reviewed at the same time. The Corps, except as indicated below, first makes a determination that potential impacts have been avoided to the maximum extent practicable; remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts and, finally, compensate for aquatic resource values. This sequence is considered satisfied where the proposed mitigation is in accordance with specific provisions of a Corps and EPA approved comprehensive plan that ensures compliance with the compensation requirements of the Section 404(b)(1) Guidelines (examples of such comprehensive plans may include Special Area Management Plans, Advance Identification areas (Section 230.80), and State Coastal Zone Management Plans). It may be appropriate to deviate from the sequence when EPA and the Corps agree the proposed discharge is necessary to avoid environmental harm (e.g., to protect a natural aquatic community from saltwater intrusion, chemical contamination, or other deleterious physical or chemical impacts), or EPA and the Corps agree that the proposed discharge can reasonably be expected to result in environmental gain or insignificant environmental losses.

In determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes. The Corps will give full consideration to the views of the resource agencies when making this determination.

1. **Avoidance.**⁴ Section 230.10(a) allows permit issuance for only the least environmentally damaging practicable alternative.⁵ The thrust of this section on alternatives is avoidance of impacts. Section 230.10(a) requires that no discharge shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. In addition, Section 230.10(a)(3) sets forth rebuttable presumptions that 1) alternatives for non-water dependent activities that do not involve special aquatic sites⁶ are available and 2) alternatives that do not involve special aquatic sites have less adverse impact on the aquatic environment.

⁴Avoidance as used in the Section 404(b)(1) Guidelines and this MOA does not include compensatory mitigation.

⁵It is important to recognize that there are circumstances where the impacts of the project are so significant that even if alternatives are not available, the discharge may not be permitted regardless of the compensatory mitigation proposed (40 CFR 230.10(c)).

⁶Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs and riffle pool complexes.

Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a).

2. Minimization. Section 230.10(d) states that appropriate and practicable steps to minimize the adverse impacts will be required through project modifications and permit conditions. Subpart H of the Guidelines describes several (but not all) means for minimizing impacts of an activity.

3. Compensatory Mitigation. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required. Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site (on-site compensatory mitigation). If on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if practicable (i.e., in close physical proximity and, to the extent possible, the same watershed). In determining compensatory mitigation, the functional values lost by the resource to be impacted must be considered. Generally, in-kind compensatory mitigation is preferable to out-of-kind. There is continued uncertainty regarding the success of wetland creation or other habitat development. Therefore, in determining the nature and extent of habitat development of this type, careful consideration should be given to its likelihood of success. Because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered.

In the situation where the Corps is evaluating a project where a permit issued by another agency requires compensatory mitigation, the Corps may consider that mitigation as part of the overall application for purposes of public notice, but avoidance and minimization shall still be sought.

Mitigation banking may be an acceptable form of compensatory mitigation under specific criteria designed to ensure an environmentally successful bank. Where a mitigation bank has been approved by EPA and the Corps for purposes of providing compensatory mitigation for specific identified projects, use of that mitigation bank for those particular projects is considered as meeting the objectives of Section II.C.3 of this MOA, regardless of the practicability of other forms of compensatory mitigation. Additional guidance on mitigation banking will be provided. Simple purchase or "preservation" of existing wetlands resources may in only exceptional circumstances be accepted as compensatory mitigation. EPA and Army will develop specific guidance for preservation in the context of compensatory mitigation at a later date.

III. Other Procedures

A. Potential applicants for major projects should be encouraged to arrange preapplication meetings with the Corps and appropriate federal, state or Indian tribal, and local authorities to determine requirements and documentation required for proposed permit evaluations. As a result of such meetings, the applicant often revises a proposal to avoid or minimize adverse impacts after developing an understanding of the Guidelines requirements by which a future Section 404 permit decision will be made, in addition to gaining an understanding of other state or tribal, or local requirements. Compliance with other statutes, requirements and reviews, such as NEPA and the Corps public interest review, may not in and of themselves satisfy the requirements prescribed in the Guidelines.

B. In achieving the goals of the CWA, the Corps will strive to avoid adverse impacts and offset unavoidable adverse impacts to existing aquatic resources. Measures which can accomplish this can be identified only through resource assessments tailored to the site performed by qualified professionals because ecological characteristics of each aquatic site are unique. Functional values should be assessed by applying aquatic site assessment techniques generally recognized by experts in the field and/or the best professional judgment of federal and state agency representatives, provided such assessments fully consider ecological functions included in the Guidelines. The objective of mitigation for unavoidable impacts is to offset environmental losses. Additionally for wetlands, such mitigation should provide, at a minimum, one for one functional replacement (i.e., no net loss of values), with an adequate margin of safety to reflect the expected degree of success associated with the mitigation plan, recognizing that this minimum requirement may not be appropriate and practicable, and thus may not be relevant in all cases, as discussed in Section II.B of this MOA.⁷ In the absence of more definitive information on the functions and values of specific wetlands sites, a minimum of 1 to 1 acreage replacement may be used as a reasonable surrogate for no net loss of functions and values. However, this ratio may be greater where the functional values of the area being impacted are demonstrably high and the replacement wetlands are of lower functional value or the likelihood of success of the mitigation project is low. Conversely, the ratio may be less than 1 to 1 for areas where the functional values associated with the

⁷For example, there are certain areas where, due to hydrological conditions, the technology for restoration or creation of wetlands may not be available at present, or may otherwise be impracticable. In addition, avoidance, minimization, and compensatory mitigation may not be practicable where there is a high proportion of land which is wetlands. EPA and Army, at present, are discussing with representatives of the oil industry, the potential for a program of accelerated rehabilitation of abandoned oil facilities on the North Slope to serve as a vehicle for satisfying necessary compensation requirements.

area being impacted are demonstrably low and the likelihood of success associated with the mitigation proposal is high.

C. The Guidelines are the environmental standard for Section 404 permit issuance under the CWA. Aspects of a proposed project may be affected through a determination of requirements needed to comply with the Guidelines to achieve these CWA environmental goals.

D. Monitoring is an important aspect of mitigation, especially in areas of scientific uncertainty. Monitoring should be directed toward determining whether permit conditions are complied with and whether the purpose intended to be served by the condition is actually achieved. Any time it is determined that a permittee is in non-compliance with mitigation requirements of the permit, the Corps will take action in accordance with 33 CFR Part 326. Monitoring should not be required for purposes other than these, although information for other uses may accrue from the monitoring requirements. For projects to be permitted involving mitigation with higher levels of scientific uncertainty, such as some forms of compensatory mitigation, long term monitoring, reporting and potential remedial action should be required. This can be required of the applicant through permit conditions.

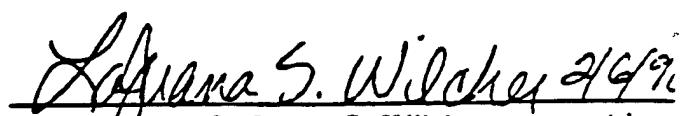
E. Mitigation requirements shall be conditions of standard Section 404 permits. Army regulations authorize mitigation requirements to be added as special conditions to an Army permit to satisfy legal requirements (e.g., conditions necessary to satisfy the Guidelines) [33 CFR 325.4(a)]. This ensures legal enforceability of the mitigation conditions and enhances the level of compliance. If the mitigation plan necessary to ensure compliance with the Guidelines is not reasonably implementable or enforceable, the permit shall be denied.

F. Nothing in this document is intended to diminish, modify or otherwise affect the statutory or regulatory authorities of the agencies involved. Furthermore, formal policy guidance on or interpretation of this document shall be issued jointly.

G. This MOA shall take effect on February 7, 1990, and will apply to those completed standard permit applications which are received on or after that date. This MOA may be modified or revoked by agreement of both parties, or revoked by either party alone upon six (6) months written notice.

 2/6/90

Robert W. Page (date)
Assistant Secretary of the Army
(Civil Works)

 2/6/90

LaJuana S. Wilcher (date)
Assistant Administrator for Water
U.S. Environmental Protection Agency



SECTION 404(b)(1) GUIDELINES MITIGATION MOA
"QUESTIONS AND ANSWERS"



Q1. Is the MOA a wetlands mitigation policy?

A1. No. The purpose of the MOA is to provide general guidance to Corps and EPA field offices on 404(b)(1) Guidelines mitigation requirements for standard permit applications in all waters of the United States, including wetlands. As such, the guidance reflects agency policy and procedures but does not itself, establish new policy.

Q2. Does the MOA establish a No Net Loss of wetlands policy?

A2. The MOA is not, in itself, a no net loss policy and neither the Section 404 program in general, nor the MOA in particular, is designed to achieve the national goal of no overall net loss of wetlands. EPA and the Corps will strive to achieve the President's goal of no net loss; however, the MOA clearly recognizes that mitigation which is not appropriate or practicable will not be required, nor will each permit be required to achieve no net loss of wetlands.

Q3. What is mitigation sequencing?

A3. In the context of the Guidelines and the MOA it means first avoiding impacts through the selection of the least damaging practicable alternative; second, taking appropriate and practicable steps to minimize impacts; and finally compensating for any remaining unavoidable impacts to the extent appropriate and practicable.

Q4. Does sequencing mean you have to first pass 230.10(a), then 230.10(b), then 230.10(c), and finally 230.10(d)?

A4. No. While sequencing (i.e., avoidance, minimization, compensation) incorporates the requirements of Sections 230.10 (a) and (d), the requirements identified at Sections 230.10 (b) and (c) are not components of mitigation under the Guidelines.

Q5. What does the one for one functional replacement signify?

A5. The objective of wetlands compensatory mitigation is to provide, at a minimum, one for one functional replacement to achieve no net loss of wetland values. In the absence of more definitive information on the functions and values at a specific site, a minimum of 1 to 1 acreage replacement may be used as a reasonable surrogate for no net loss of functions and values. However, the MOA recognizes that this ratio may vary on a case-by-case basis and may not be appropriate and practicable in all cases.

Q6. Is it possible to issue a permit that causes a net loss of wetlands?

A6. Yes. Once a project passes 230.10(a), (b), and (c) of the Guidelines (also reference question number 4), a wetlands loss may occur when mitigation measures are not feasible, practicable or would accomplish only inconsequential reductions in impacts. However, it should be emphasized that a project that causes or contributes to significant degradation of the waters of the United States will fail 230.10(c) notwithstanding the exceptions for 230.10(d) noted in the above sentence.

Q7. Have the definitions of the terms "appropriate" and "practicable" been changed?

A7. No. Section 230.3(q) of the Guidelines defines the term practicable as meaning "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." Since the term appropriate is not explicitly defined in the Guidelines or Corps regulations, its meaning was clarified in the MOA to mean "appropriate to the scope and degree" of environmental impacts of a project (also reference question number 8).

Q8. Is appropriate mitigation based solely on the values and functions of the aquatic resource that will be impacted?

A8. Yes. A key objective of the Guidelines and the MOA is to offset unavoidable adverse impacts to aquatic resources. The determination of what level of mitigation constitutes "appropriate" mitigation is based solely on the values and functions of the aquatic resource that will be impacted. Further, under the Guidelines, appropriate

mitigation is required only to the extent that it is practicable. Public interest characteristics such as need and societal value are not factored into a determination of appropriate mitigation as determined by the Guidelines. Such considerations are, however, taken into account during the public interest review process.

Q9. Is there a preferred method for assessing functional values of aquatic resources?

A9. Not at this time. The Wetland Evaluation Technique (WET) considers a broad range of ecological functions and its use will likely increase. We realize that WET needs additional refinement and regionalization, both of which are underway. However, the best professional judgment of the Corps, EPA and resource agencies' representatives must continue to play a vital role in all resource assessments.

Q10. Is there sufficient flexibility built into the MOA to reflect the technical challenges represented in Alaska?

A10. Yes. EPA and the Corps recognize that the physical characteristics associated with wetlands underlain by permafrost pose scientific challenges regarding compensatory mitigation. Permafrost conditions, hydrology and climatic factors create technical problems which may make opportunities for wetlands creation and restoration not always practicable. The MOA states (see Section III.B.) that only appropriate and practicable mitigation is required under the Guidelines and, as a result, no net loss of wetlands functions and values may not be achieved in each and every permit action. This technical uncertainty emphasizes the need for Corps and EPA staff in Alaska to coordinate through established procedures such as the Abbreviated Permit Process and pre-application consultations to identify what is appropriate and practicable compensatory mitigation on a case-by-case basis.

Q11. Are there other areas of the country that also represent special challenges in the implementation of the MOA?

A11. Yes. In developing the MOA, the Corps and EPA recognized that the flexibility built into the Guidelines must also be incorporated into the provisions contained in the MOA in order to be responsive to varying ecological conditions that exist nationwide. An issue that has been

brought to our attention is how the MOA will affect certain environmental projects in Louisiana (projects where the specific purpose is to enhance the environment). The MOA recognizes these situations by providing that where EPA and the Corps agree, it may be appropriate to deviate from the mitigation sequence in circumstances "necessary to avoid environmental harm (e.g., to protect a natural aquatic community from saltwater intrusion...)."

Q12. Will mitigation banks and preservation of existing wetlands be allowed?

A12. The MOA recognizes that mitigation banking may be an acceptable form of compensatory mitigation. EPA and Army are developing additional guidance on this subject. In the meantime, mitigation banks will be considered for approval on a case-by-case basis as they have been in the past. Simple purchase or "preservation" may be acceptable only in exceptional circumstances. EPA and the Corps will develop specific guidance for preservation in the context of compensatory mitigation at a later date.

Q13. How will the MOA affect applications in process?

A13. It doesn't. It applies to completed applications which are received on or after 7 February 1990.

Q14. Must an alternatives analysis and/or compensatory mitigation plan be completed before a public notice can be issued?

A14. No. The Corps regulations and application form are fairly specific about what information is needed to find an application complete. Information necessary to conduct a complete Guidelines or Public Interest Review is not required for the issuance of a public notice. If such information is provided by the applicant, however, it should be summarized and presented in the public notice.

Q15. Is it necessary to issue a new public notice for discharges of fill material associated with a compensatory mitigation plan, or part of a plan, that was not included in the original notice?

A15. Generally no. However, this is a judgment call and if the proposed changes result in a substantial increase in the scope of the overall project or there has been a demonstrated interest by the public, an additional notice may be required.

Q16. To what extent must the Corps coordinate changes in a proposed project, including mitigation plans, with the resource agencies?

A16. In general, all substantive changes should be coordinated. The Corps is responsible for determining the appropriate amount of coordination, keeping in mind that insufficient coordination is a criterion for permit elevation under the 404(q) MOAs.

Q17. Is the Corps still responsible for determining compliance with the 404(b)(1) Guidelines on a permit-by-permit basis?

A17. Yes. As in the past, Guidelines compliance determinations are the responsibility of the Corps. EPA will continue to respond to public notices as it has in the past using the MOA to develop its position (recommendations) on projects.

Q18. Does the MOA require the Corps to take an enforcement action whenever it discovers non-compliance with the mitigation requirements of a permit?

A18. No. The Corps is required to take action in accordance with 33 CFR Part 326 which establishes a discretionary responsibility regarding the initiation of enforcement actions. The Corps, as part of a new emphasis on permit compliance, is strongly encouraged to take appropriate action to ensure compliance with all permit conditions, particularly conditions imposed to satisfy the Guidelines. The MOA does not affect this initiative.

Q19. Does the MOA apply to after-the-fact applications?

A19. Yes.

Q20. How does the MOA affect Corps civil works projects?

A20. While the MOA focuses on the Section 404 regulatory program, the Corps plans to integrate the mitigation framework provided in the MOA into all Corps activities.



United States Environmental Protection Agency

Office of Wetlands, Oceans and Watersheds
Washington, D.C. 20460



United States Department of the Army

U.S. Army Corps of Engineers
Washington, D.C. 20314

AUG 23 1993

MEMORANDUM TO THE FIELD

**SUBJECT: ESTABLISHMENT AND USE OF WETLAND MITIGATION BANKS IN
THE CLEAN WATER ACT SECTION 404 REGULATORY PROGRAM**

1. This memorandum provides general guidelines for the establishment and use of wetland mitigation banks in the Clean Water Act Section 404 regulatory program. This memorandum serves as interim guidance pending completion of Phase I of by the Corps of Engineers' Institute for Water Resources study on wetland mitigation banking¹, at which time this guidance will be reviewed and any appropriate revisions will be incorporated into final guidelines.
2. For purposes of this guidance, wetland mitigation banking refers to the restoration, creation, enhancement, and, in exceptional circumstances, preservation of wetlands or other aquatic habitats expressly for the purpose of providing compensatory mitigation in advance of discharges into wetlands permitted under the Section 404 regulatory program. Wetland mitigation banks can have several advantages over individual mitigation projects, some of which are listed below:
 - a) Compensatory mitigation can be implemented and functioning in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.
 - b) It may be more ecologically advantageous for maintaining the integrity of the aquatic ecosystem to consolidate compensatory mitigation for impacts to many smaller, isolated or fragmented habitats into a single large parcel or contiguous parcels.

¹The Corps of Engineers Institute for Water Resources, under the authority of Section 307(d) of the Water Resources Development Act of 1990, is undertaking a comprehensive two-year review and evaluation of wetland mitigation banking to assist in the development of a national policy on this issue. The interim summary report documenting the results of the first phase of the study is scheduled for completion in the fall of 1993.

c) Development of a wetland mitigation bank can bring together financial resources and planning and scientific expertise not practicable to many individual mitigation proposals. This consolidation of resources can increase the potential for the establishment and long-term management of successful mitigation.

d) Wetland mitigation banking proposals may reduce regulatory uncertainty and provide more cost-effective compensatory mitigation opportunities.

3. The Section 404(b)(1) Guidelines (Guidelines), as clarified by the "Memorandum of Agreement Concerning the Determination of Mitigation under the Section 404(b)(1) Guidelines" (Mitigation MOA) signed February 6, 1990, by the Environmental Protection Agency and the Department of the Army, establish a mitigation sequence that is used in the evaluation of individual permit applications. Under this sequence, all appropriate and practicable steps must be undertaken by the applicant to first avoid and then minimize adverse impacts to the aquatic ecosystem. Remaining unavoidable impacts must then be offset through compensatory mitigation to the extent appropriate and practicable. Requirements for compensatory mitigation may be satisfied through the use of wetland mitigation banks, so long as their use is consistent with standard practices for evaluating compensatory mitigation proposals outlined in the Mitigation MOA. It is important to emphasize that, given the mitigation sequence requirements described above, permit applicants should not anticipate that the establishment of, or participation in, a wetland mitigation bank will ultimately lead to a determination of compliance with the Section 404(b)(1) Guidelines without adequate demonstration that impacts associated with the proposed discharge have been avoided and minimized to the extent practicable.

4. The agencies' preference for on-site, in-kind compensatory mitigation does not preclude the use of wetland mitigation banks where it has been determined by the Corps, or other appropriate permitting agency, in coordination with the Federal resource agencies through the standard permit evaluation process, that the use of a particular mitigation bank as compensation for proposed wetland impacts would be appropriate for offsetting impacts to the aquatic ecosystem. In making such a determination, careful consideration must be given to wetland functions, landscape position, and affected species populations at both the impact and mitigation bank sites. In addition, compensation for wetland impacts should occur, where appropriate and practicable, within the same watershed as the impact site. Where a mitigation bank is being developed in conjunction with a wetland resource planning initiative (e.g., Special Area Management Plan, State Wetland Conservation Plan) to satisfy particular wetland restoration objectives, the permitting agency will determine, in coordination with the Federal resource agencies, whether use of the bank should be considered an appropriate form of compensatory mitigation for impacts occurring within the same watershed.

5. Wetland mitigation banks should generally be in place and functional before credits may be used to offset permitted wetland losses. However, it may be appropriate to allow incremental distribution of credits corresponding to the appropriate stage of successful establishment of wetland functions. Moreover, variable mitigation ratios (credit acreage to

impacted wetland acreage) may be used in such circumstances to reflect the wetland functions attained at a bank site at a particular point in time. For example, higher ratios would be required when a bank is not yet fully functional at the time credits are to be withdrawn.

6. Establishment of each mitigation bank should be accompanied by the development of a formal written agreement (e.g., memorandum of agreement) among the Corps, EPA, other relevant resource agencies, and those parties who will own, develop, operate or otherwise participate in the bank. The purpose of the agreement is to establish clear guidelines for establishment and use of the mitigation bank. A wetlands mitigation bank may also be established through issuance of a Section 404 permit where establishing the proposed bank involves a discharge of dredged or fill material into waters of the United States. The banking agreement or, where applicable, special conditions of the permit establishing the bank should address the following considerations, where appropriate:

- a) location of the mitigation bank
- b) goals and objectives for the mitigation bank project;
- c) identification of bank sponsors and participants;
- d) development and maintenance plan;
- e) evaluation methodology acceptable to all signatories to establish bank credits and assess bank success in meeting the project goals and objectives;
- f) specific accounting procedures for tracking crediting and debiting;
- g) geographic area of applicability;
- h) monitoring requirements and responsibilities;
- i) remedial action responsibilities including funding; and
- j) provisions for protecting the mitigation bank in perpetuity.

Agency participation in a wetlands mitigation banking agreement may not, in any way, restrict or limit the authorities and responsibilities of the agencies.

7. An appropriate methodology, acceptable to all signatories, should be identified and used to evaluate the success of wetland restoration and creation efforts within the mitigation bank and to identify the appropriate stage of development for issuing mitigation credits. A full range of wetland functions should be assessed. Functional evaluations of the mitigation bank should generally be conducted by a multi-disciplinary team representing involved resource and regulatory agencies and other appropriate parties. The same methodology should be used to determine the functions and values of both credits and debits. As an alternative, credits and debits can be based on acres of various types of wetlands (e.g., National Wetland Inventory classes). Final determinations regarding debits and credits will be made by the Corps, or other appropriate permitting agency, in consultation with Federal resource agencies.

8. Permit applicants may draw upon the available credits of a third party mitigation bank (i.e., a bank developed and operated by an entity other than the permit applicant). The

Section 404 permit, however, must state explicitly that the permittee remains responsible for ensuring that the mitigation requirements are satisfied.

9. To ensure legal enforceability of the mitigation conditions, use of mitigation bank credits must be conditioned in the Section 404 permit by referencing the banking agreement or Section 404 permit establishing the bank; however, such a provision should not limit the responsibility of the Section 404 permittee for satisfying all legal requirements of the permit.

Robert H. Wayland 8/23/93
ROBERT H. WAYLAND, III (date)
Director
Office of Wetlands, Oceans,
and Watersheds
U.S. Environmental Protection Agency

Michael J. Davis 8/23/93
MICHAEL L. DAVIS (date)
Office of the Assistant Secretary
of the Army (Civil Works)
Department of the Army

APPENDIX 2

FUNCTION-VALUE ASSESSMENT
METHODOLOGY WORKSHEET

FUNCTION-VALUE ASSESSMENTS		WETLAND I.D. _____	Prepared by: _____ Date: _____	
TOTAL AREA OF WETLAND: NW _____	SCS _____	MAN MADE? _____	IS THE WETLAND PART OF A WILDLIFE CORRIDOR? _____	
OR A "HABITAT ISLAND"? _____	ADJACENT LAND USE _____	DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT _____	CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT _____	
DOMINANT WETLAND SYSTEMS PRESENT _____ <small>Circle Impacted Type</small>				
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? _____		IF NOT, WHERE DOES THE WETLAND LIE IN THE DRAINAGE BASIN? _____		
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? _____		AQUATIC DIVERSITY/ABUNDANCE _____ VEGETATIVE DIVERSITY/ABUNDANCE _____		
WILDLIFE DIVERSITY/ABUNDANCE _____		ANTICIPATED IMPACTS _____		
WETLAND IMPACTED: NW _____		SCS _____	ACOE Confidence Level _____	
FUNCTION	Function Occurrence Y N	Rationale Why (Number)	Principal Valuable Function(s)	Comments
Groundwater Recharge/Discharge				
Floodflow Alteration (Storage & Desynchronization)				
Sediment/Shoreline Stabilization				
Sediment/Toxicant Retention				
Nutrient Removal/Retention/ Transformation				
Production Export (Nutrient)				
Fish & Shellfish Habitat				
Wildlife Habitat				
Endangered Species Habitat				
Visual Quality/Aesthetics				
Educational Scientific Value				
Recreation (Consumptive and Non-Consumptive)				
Uniqueness/Heritage				
NOTES: _____				

FUNCTION: GROUNDWATER INTERCHANGE (Recharge/Discharge)

Considers the potential for the wetland to serve as a groundwater recharge/discharge area.

CONSIDERATIONS/QUALIFIERS

1. Public or private wells occur downstream of wetland.
2. Potential for public or private wells downstream of wetland exists.
3. Wetland is underlain by stratified drift.
4. Gravel or sandy soils present in or adjacent to wetland.
5. Fragipan does not occur in wetland.
6. Fragipan, impervious soils or bedrock, occur in wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge present.
9. Wetland is associated with a watercourse, but lacks a defined outlet or contains a constricted outlet.
10. Wetland contains outlet only.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with wetland high.
13. Signs of groundwater discharge present.
14. Temperature of water suggests discharge.
15. Wetland shows signs of variable water levels.
16. Other.

FUNCTION: FLOODFLOW ALTERATION (Storage & Desynchronization)

Considers the effectiveness of the wetland in reducing flood damages and retaining water over prolonged periods, adding to the stability of the wetland ecological system or buffering features of social or economic value situated in erosion prone areas.

CONSIDERATIONS/QUALIFIERS

1. Area of wetland is large relative to its watershed.
2. Wetland occurs in upper watershed.
3. Effective flood storage small or non-existent upslope or above wetland.
4. Wetland watershed contains a high degree of impervious surfaces.
5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in a relatively flat area that has storage potential.
7. Wetland has an intermittent outlet, ponded water or variable water level signs present.
8. During flood events, wetland can retain higher volumes of water than under normal or average rainfall conditions.
9. Wetland receives and retains overland or sheet flow runoff

from surrounding uplands.

10. In the event of large storm, wetland may receive and detain excessive floodwater from nearby watercourse.

IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE, STOP HERE

11. Wetland is associated with one or more watercourse.
12. Wetland watercourse is sinuous or diffuse.
13. Wetland outlet constricted.
14. Channel flow velocity is affected by wetland.
15. Land uses downstream protected by wetland.
16. Wetland contains high vegetation density.
17. Other.

FUNCTION: SEDIMENT/SHORELINE STABILIZATION

Considers the potential and the effectiveness of the wetland in preventing stream bank or shoreline erosion.

CONSIDERATIONS/QUALIFIERS

1. Erosion indications, siltation present.
2. Topographical gradient in wetland present.
3. Potential sediment sources present up-slope.

IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE, STOP HERE

4. No distinct shoreline or bank evident between waterbody and wetland or upland.
5. A distinct step between the open water body or stream and the adjacent land exists (sharp bank) with dense roots throughout.
6. Wide wetland (>10') bordering watercourse, lake, or pond.
7. High water velocities in wetland.
8. Potential sediment sources present upstream.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch present.
11. Boating activity present.
12. Dense vegetation bordering watercourse, lake, or pond.
13. High percentage of energy absorbing emergents and/or shrubs bordering watercourse, lake, or pond.
14. Vegetation comprised of large trees and shrubs which withstand major flood events or erosive times and stabilize the shoreline on a large scale (feet).
15. Vegetation comprised of dense resilient herbaceous layer which stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive times.

FUNCTION: SEDIMENT/TOXICANT RETENTION

Considers the effectiveness of the wetland as a trap for sediment in runoff water from surrounding uplands, or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS

1. Potential sources of excess sediment in the watershed above the wetland.
2. Potential or known sources of toxicants in watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat in wetland present.
4. Mineral, fine grained, or organic soil present.
5. High water retention time present in wetland.

IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE, STOP HERE

6. Wetland associated with intermittent or perennial stream, or a lake.
7. Channelized flows have visible velocity decrease in wetland.
8. Effective floodwater storage of wetland occurring. Areas of impounded open water present.
9. No indicators of erosive forces present. No high water velocities present.
10. Diffuse water flow through the wetland.
11. Wetland has high degree of water and vegetation interspersion.
12. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation present.
13. Other.

FUNCTION: NUTRIENT REMOVAL/RETENTION/TRANSFORMATION

Consider the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the wetlands ability to process these nutrients into other forms or trophic levels.

CONSIDERATIONS/QUALIFIERS

1. Wetland large relative to size of watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping in the wetland exists.
4. Potential sources of excess nutrients present in the watershed above the wetland.
5. Wetland saturated for most of the season. Ponded water present in wetland.

6. Deep organic/sediment deposits present.
7. Slowly drained mineral, fine grained or organic soils present.
8. Dense vegetation present.
9. Emergent vegetation and/or dense woody stems dominant.
10. Aquatic diversity/abundance sufficient to utilize nutrients.
11. Opportunity for nutrient attenuation exists.
12. Vegetation diversity/abundance sufficient to utilize nutrients.

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13. Waterflow through wetland diffuse.
14. Water retention/detention time in wetland increased by constricted outlet or thick vegetation.
15. Water moves slowly through wetland.
16. Other.

FUNCTION: PRODUCTION EXPORT (Nutrient)

Evaluates the suitability or ability of the wetland to produce food or usable products for man or other living organisms.

CONSIDERATIONS/QUALIFIERS

1. Wildlife food sources grow within wetland.
2. Detritus development present within wetland.
3. Economically or commercially used products found in wetland.
4. Evidence of wildlife use within wetland present.
5. Higher trophic level consumers utilizing the wetland.
6. Fish or shellfish developing or occurring in the wetland.
7. High vegetation density present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic diversity/abundance present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. Flushing of relatively large amounts of organic plant material occurs from wetland.
12. Wetland contains flowering plants which are used by nectar-gathering insects.
13. Indications of export present.
14. High production levels occurring, however, no visible signs of export (assumes export is attenuated).
15. Other.

FUNCTION: FISH & SHELLFISH HABITAT

Considers the suitability of watercourses associated with the wetland for fish and shellfish habitat.

CONSIDERATIONS/QUALIFIERS

1. Forest land dominant in watershed above wetland.
2. Abundance of cover objects present.

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3. Size of wetland able to support large fish/shellfish populations.
4. Wetland is part of a larger, contiguous watercourse.
5. Wetland has sufficient size and depth in open water areas so as to not freeze solid and retains some open water during winter.
6. Stream width (bank to bank), more than 50 feet.
7. Quality of the watercourse associated with the wetland able to support healthy fish/shellfish population.
8. Streamside vegetation provides shade for watercourse.
9. Spawning areas present (submerged vegetation or gravel beds).
10. Food available to fish/shellfish populations within wetland.
11. Barrier(s) to anadromous fish (such as dams {including beaver dams}, waterfalls, road crossing, etc.) along the stream reach associated with the wetland absent.
12. Evidence or occurrence of fish sited within wetland.
13. Wetland is stocked with fish.
14. Watercourse is persistent.
15. Man-made streams absent.
16. Water velocities not too excessive for fish usage.
17. Defined stream channel present.
18. Other.

FUNCTION: WILDLIFE HABITAT

Considers the suitability of the wetland as habitat for those animals typically associated with wetlands and the wetland edge. Also the use of the wetland as habitat for migrating species and species dependent upon the wetland at some time in their life cycle.

CONSIDERATIONS/QUALIFIERS

1. Wetland not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with the wetland meets or exceeds class A or B standards.
3. Wetland not fragmented by development.
4. Upland surrounding wetland is undeveloped.
5. More than 40% of wetland edge bordered by upland wildlife habitat (brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland contiguous with other wetland systems via watercourse or lake.
7. Wildlife access to other wetlands (overland) present.

8. Wildlife food sources within wetland or nearby.
9. Wetland exhibits high degree of interspersion of vegetation classes and/or open water.
10. Two or more islands or inclusions of upland within wetland present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland present.
13. Density of wetland vegetation high.
14. Wetland exhibits high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (tree/shrub/vine/herb/grasses/mosses/etc.).
16. Plant/animal indicator species present.
17. Animal signs (tracks, scats, nesting areas, etc.) observed.
18. Several uses vary for wildlife, wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian population.
21. Wetland has high avian utilization or potential.
22. Indications of less disturbance-tolerant species present.
23. Signs of wildlife habitat enhancement present (birdhouses, nesting boxes, food sources, etc.).
24. Other.

FUNCTION: ENDANGERED SPECIES HABITAT

Considers the suitability of the wetland to support threatened or endangered species because of specialized habitat requirements.

CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.
3. Wetland is a national natural landmark or recognized as an exemplary natural community.
4. Wetland has local significance because it has biological, geological, or other features which are locally rare or unique.
5. Wetland is known to be a study site for scientific research.
6. Little disturbance has occurred in and around the wetland.
7. A large area of undeveloped land surrounds wetlands.
8. Other.

FUNCTION: VISUAL QUALITY AESTHETICS

Considers the visual and aesthetic quality or usefulness of the wetland.

CONSIDERATIONS/QUALIFIERS

1. Multiple wetland classes visible from primary viewing location(s).
2. Emergent marsh and/or open water visible from primary viewing location(s).
3. Diversity of vegetative species visible from primary viewing location(s).
4. Wetland dominated by flowering plants, or plants which turn vibrant colors in different seasons.
5. Surrounding land use visible from primary viewing locations undeveloped.
6. Visible surrounding land form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line through wetland exists.
13. Other.

FUNCTION: EDUCATIONAL/SCIENTIFIC VALUE

Considers the suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.

CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened, rare or endangered species.
2. Little/no disturbance occurring in wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school buses within or near wetland.
9. Potential educational site is within safe walking distance or short drive to schools.
10. Potential educational site within safe walking distance to other plant communities.

11. Direct access to perennial stream at potential educational site available.
12. Direct access to pond or lake at potential educational site available.
13. No known safety hazards within potential educational site.
14. Public access to potential educational site controlled.
15. Handicap accessibility available.
16. Site is currently used for educational or scientific purposes.
17. Other.

FUNCTION: RECREATION (Consumptive and Non-Consumptive)

Considers the suitability of the wetland and associated watercourses for canoeing, boating, fishing, hunting and other active or passive recreational activities.

CONSIDERATIONS/QUALIFIERS

1. Wetland is part of a recreation area, park, forest or refuge.
2. Fishing available within or from wetland.
3. Hunting is permitted in wetland.
4. Hiking occurs or has potential to occur within wetland.
5. Wetland is a valuable wildlife habitat.
6. Watercourse, pond or lake associated with the wetland unpolluted.
7. High visual/aesthetic quality of potential recreation site.
8. Access to water available at potential recreation site for boating, canoeing or fishing.
9. Watercourse associated with wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at potential recreation site.
11. Accessibility and travel ease occurs within the system.
12. Wetland is within short drive or walk from highly populated public and private areas.
13. Other.

FUNCTION: UNIQUENESS/HERITAGE

Considers the wetland for certain special values such as archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location.

CONSIDERATIONS/QUALIFIERS

1. Upland surrounding wetland primarily urban.
2. Upland surrounding wetland developing rapidly.

3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep) including streams occur within wetlands.
4. Three or more wetland classes present.
5. Deep and/or shallow marsh, or wooded swamp dominant.
6. High degree of interspersion of vegetation and/or open water occurring in wetland.
7. Well-vegetated stream corridor (15 feet on each side of stream) occurs in wetland.
8. Potential educational site is within a short drive or safe walk from schools.
9. Off-road parking at potential educational site suitable for school buses.
10. No known safety hazards exist within potential educational site.
11. Direct access to perennial stream or lake at potential educational site.
12. Two or more wetland classes visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) visible from primary viewing locations.
14. 0.5 acres of open water or 200 feet of stream visible from primary viewing locations.
15. Large area of wetland dominated by flowering plants, or plants which turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations unpolluted and/or undisturbed.
17. Overall view of wetland available from surrounding upland.
18. Quality of water associated with wetland high.
19. Opportunities for wildlife observation available.
20. Historical buildings occur within wetland.
21. Presence of pond or pond site and remains of dam occur within wetland.
22. Wetland within 50 yards of nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures or associated features occur within wetland.
24. Wetland contains critical habitat for a state or federally listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a national natural landmark or recognized as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features which are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other.